Developing a Roadmap to Success

What's Needed to Support UPRs

Presented to: The 9th Pacific Project Team Meeting

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Federal Aviation Administration

Introduction

- **Review of Terms of Reference (TORs) for Pacific Project (PPT) and relevant discussions to airspace analysis**

- **Discuss necessary requirements/inhibitors to support UPRs and results from seamless airspace chart**

- **Evaluate operator desired UPR improvements in respective airspace volumes compared to ANSP requirements**

TOR and PPT Discussion Highlights

- **Objectives in TORs**
  - improve operational efficiency with UPRs as primary navigation means
  - development of "seamless and homogenous airspace for air traffic between North America and Asia…"
- **TOR Work Program includes**
  - analysis of current flows,
  - review of existing CNS/ATM plans/capabilities
  - gap analysis

TOR and PPT Discussion Highlights

- **Based on size of Pacific Project airspace, suggested division of airspace into four geographical regions**
  - Arctic
  - Anchorage/Russian Trans East (RTE)
  - NOPAC
  - PACOTS/CENPAC

TOR and PPT Discussion Highlights

- **For discussions on gap analysis and possible UPR expansion, recommendation to exclude discussions on PACOTS/CENPAC**
  - Avoids duplication of efforts from ongoing work at IPACG
- **A seamless airspace chart was developed and distributed to PPT ANSPs to assess current and future planned capabilities**
  - Responses received from 5 of 8 ANSPs

TOR and PPT Discussion Highlights

- **The seamless airspace chart covers three basic categories-**
  - Surveillance
  - Procedures
  - Communication
- **The PPT was asked to assess current/future capabilities in conjunction with operator perceived shortfalls/lack of efficiency, determine desired end-state, develop realistic short, mid, and long term goals with success criteria.**

What is needed to support/expand UPRs?

- **FAA asked for input from all three of its Oceanic Facilities and the PPT ANSPs**
- **Three general areas at core of managing UPRs**
  - Technology
    - Ground automation, surveillance, comms., aircraft equipage
  - Rules
    - Legislative, restrictions that avoid SUAs or cause automation problems, safety analysis
  - Predictability
    - Traffic density, complexity, other traffic management considerations

What is needed to support/expand UPRs- Technology

- **Various Technologies to Consider**
  - Ground automation that tracks aircraft and detects conflictions
    - Can be done manually but is time/labor-intensive
      - Requires controller to manually plot crossing points, some of which may not be associated with fix and calculate separation
  - Surveillance
    - Radar, ADS-C, ADS-B
  - Communication
    - VHF, HF, CPDLC, AIDC
      - Also applies to reliability
        » In northern latitudes may not be reliable or usable
  - Aircraft Equipage
    - Application of reduced separation, ADS-C/CPDLC

What is needed to support/expand UPRs- Technology

- **Arctic Surveillance**

ANSP	Radar	ADS-C	ADS-B	Other
Anchorage Arctic	No	Fall 2015	No	N/A
Edmonton	Partial	Winter 2015	Yes	Space-based ADS-B 2018
Magadan	Partial	Yes	No	N/A
Murmansk	Partial	2018	No	N/A

What is needed to support/expand UPRs- Technology

- **Anchorage/RTE Surveillance**

ANSP	Radar	ADS-C	ADS-B	Other
Anchorage	Yes	Yes	Yes	N/A
Edmonton	Partial	Winter 2015	Yes	Space-based ADS-B 2018
Magadan	Partial	Yes	No	N/A
P-K	Partial	2016-2017	No	N/A

What is needed to support/expand UPRs- Technology

- **NOPAC Surveillance**

ANSP	Radar	ADS-C	ADS-B	Other
Anchorage	Partial	Yes	Partial	N/A
Fukuoka	Yes	Yes	No	N/A
Oakland	Partial	Yes	No	N/A
P-K	Partial	2016-2017	No	N/A
Vancouver	Yes	2016	No	Space-based ADS-B 2018
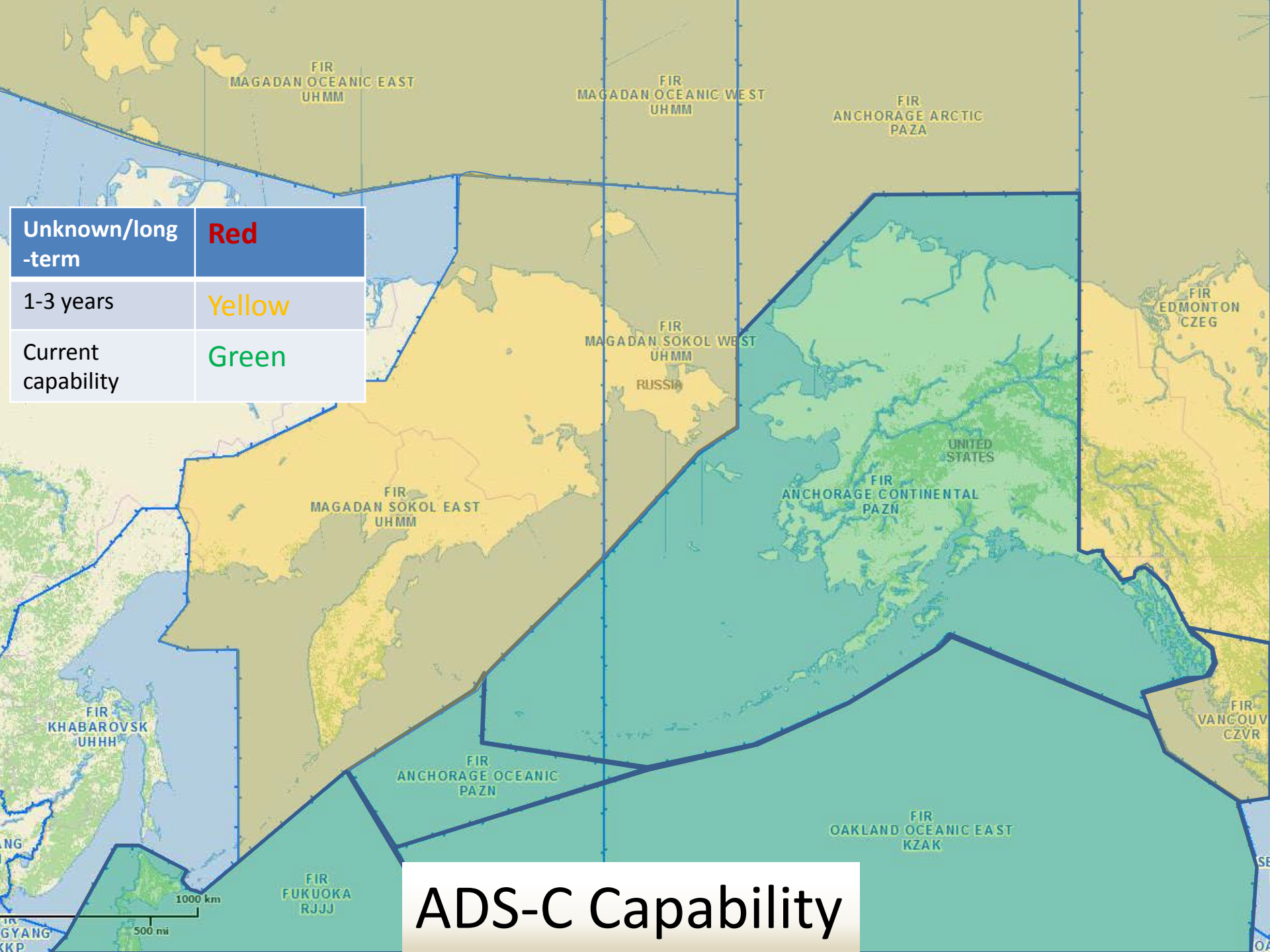
ADS-C Capability

What is needed to support/expand UPRs- Technology

- **Communications- Arctic**

ANSP	CPDLC	AIDC
Anchorage Arctic	Yes	Yes
Edmonton	Yes	Yes
Magadan	Yes	2018
Murmansk	2018	2016

What is needed to support/expand UPRs- Technology

- **Communications- Anchorage/RTE**

ANSP	CPDLC	AIDC
Anchorage	Yes	Yes
Edmonton	Yes	Yes
Magadan	Yes	Yes
P-K	2016-2017	2018

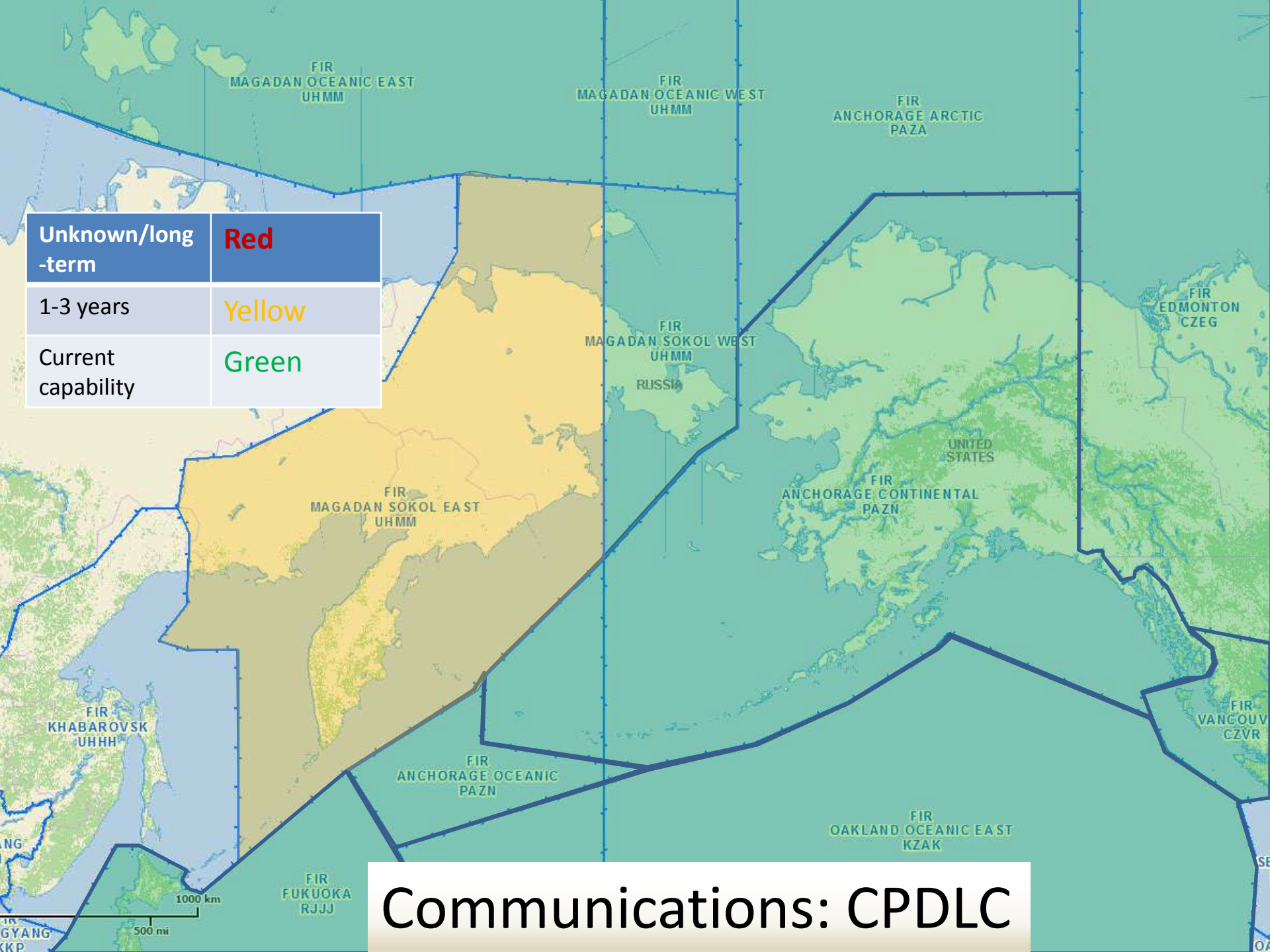# What is needed to support/expand UPRs- Technology

- **Communications- NOPAC**

ANSP	CPDLC	AIDC
Anchorage	Yes	Yes
Fukuoka	Yes	Yes
Oakland	Yes	Yes
P-K	2016-2017	2018
Vancouver	Yes	Yes
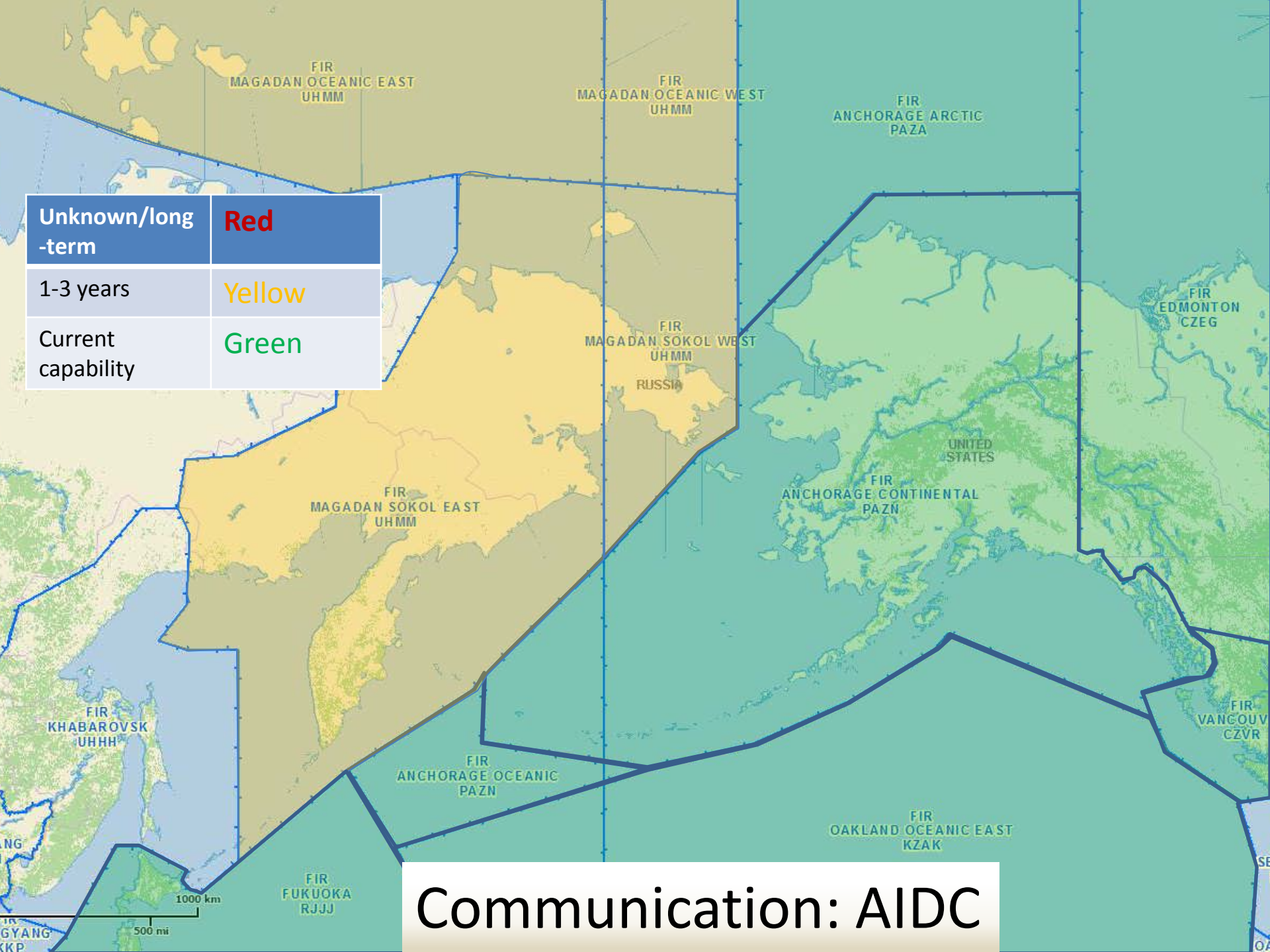
Unknown/long -term	Red
1-3 years	Yellow
Current capability	Green

Communication: AIDC

Unknown/long-term	Red
1-3 years	Yellow
Current capability	Green

Communications: CPDLC

What is needed to support/expand UPRs- Technology

- **Reduced Separation- Arctic**

ANSP	50 NM Lateral	50 NM Longitudinal	30 NM Lateral	30 NM Longitudinal
Anchorage Arctic	Yes	TBA	TBA	TBA
Edmonton	RNP-4 or 10 aircraft only	TBA	TBA	TBA
Magadan	TBA	TBA	TBA	TBA
Murmansk	TBA	TBA	TBA	TBA

What is needed to support/expand UPRs -Technology

- **Reduced Separation- Anchorage/RTE**

| ANSP	50 NM Lateral	50 NM Longitudinal	30 NM Lateral	30 NM Longitudinal
Anchorage	Yes	Yes	Yes	Yes
Edmonton	RNP-4 or 10 aircraft only	TBA	TBA	TBA
Magadan	TBA	TBA	TBA	TBA
P-K	TBA	TBA	TBA	TBA

What is needed to support/expand UPRs- Technology

- **Reduced Separation- NOPAC**

ANSP	50 NM Lateral	50 NM Longitudinal	30 NM Lateral	30 NM Longitudinal
Anchorage	Yes	Yes	Yes	Yes
Fukuoka	Yes	Yes	Yes	Yes
Oakland	Yes	Yes	Yes	Yes
P-K	TBA	TBA	TBA	TBA
Vancouver	Yes	Yes	2016	2016

Unknown/long-term	Red
50 Lateral Only	Purple
50 Lat/50 Long	Green
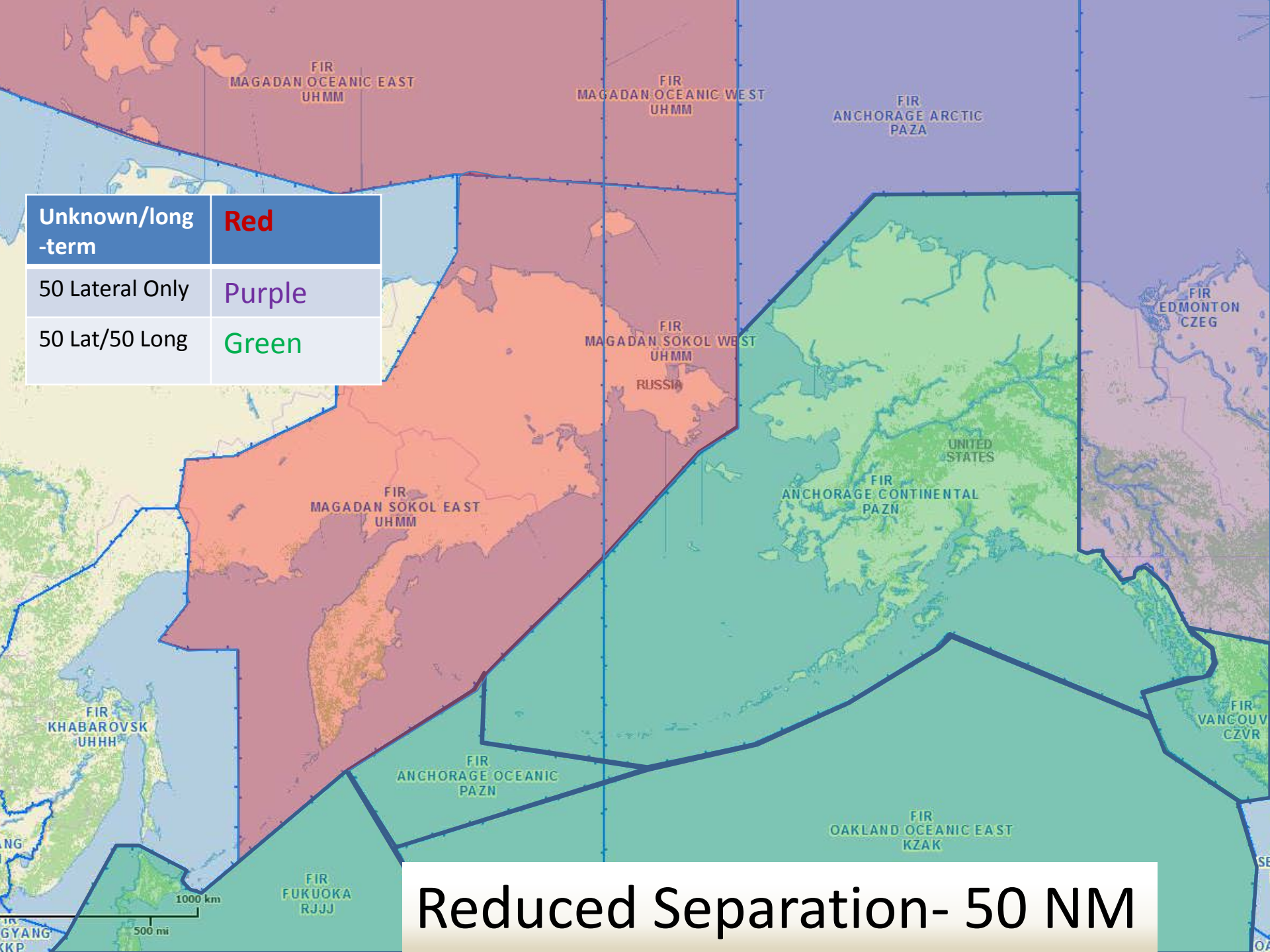
Reduced Separation- 50 NM
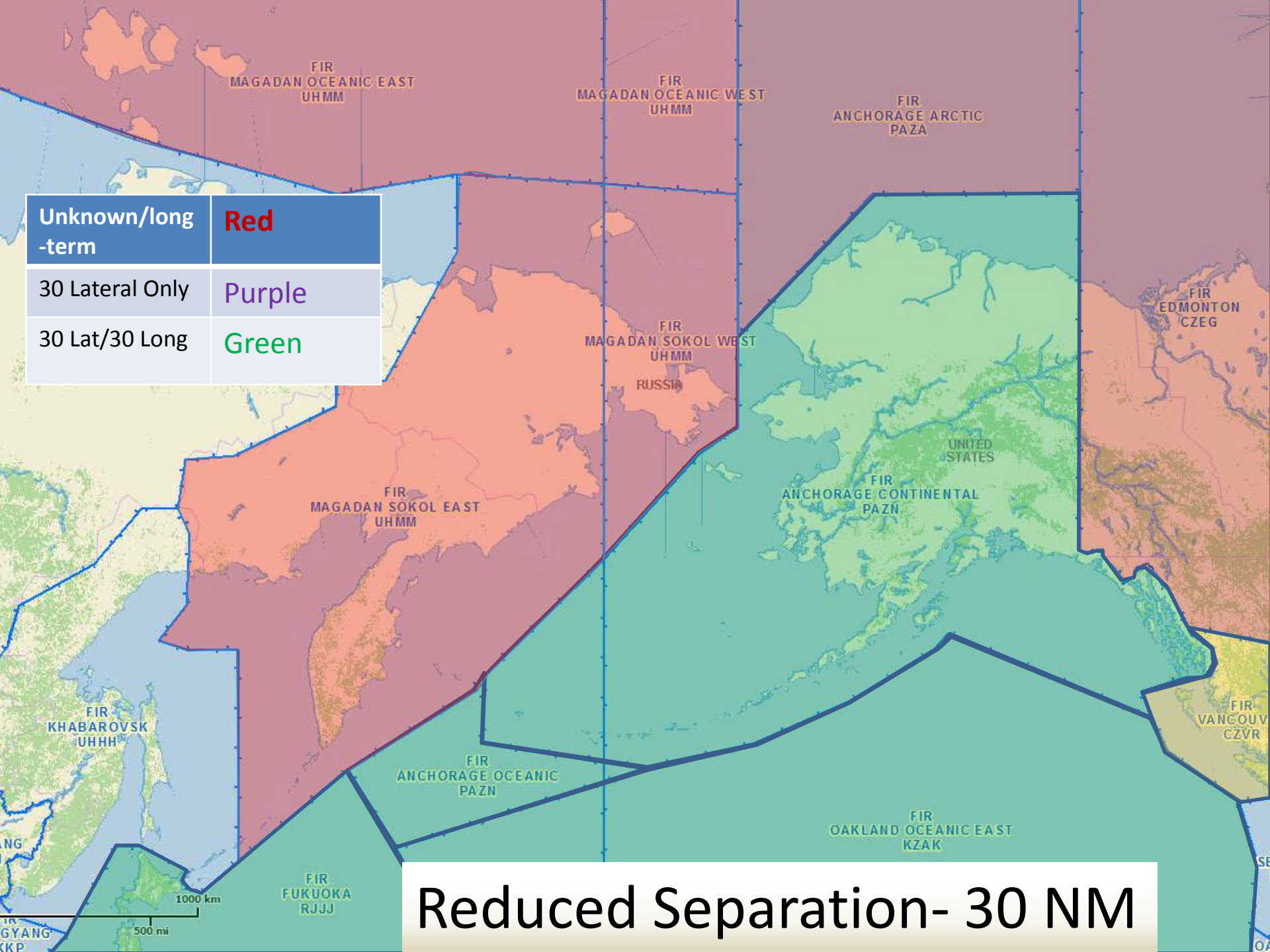
Unknown/long-term	Red
30 Lateral Only	Purple
30 Lat/30 Long	Green

Reduced Separation- 30 NM

# What is needed to support/expand UPRs- Rules

- **Rules is a somewhat generic term but really covers two basic areas in reference to UPRs**
  - Legislative
    - Does regulator allow or are there provisions within procedures documents to allow?
  - Restrictions
    - Avoidance of SUA
    - Prevent automation or coordination issues
    - Those needed to enhance/maintain safety
    - Traffic management

What is needed to support/expand UPRs- Predictability

- **Put simply, knowing where aircraft are going to be**
  - Traffic density
    - More aircraft in one place mean fewer at optimal altitude
      - Does benefit of UPR outweigh that of flex or fixed route?
  - Sector complexity
    - Unidirectional, bidirectional, and/or crossing traffic can affect. Traffic density also impacts.
  - Traffic management
    - Reroute off of UPR for traffic
      - More likely today or in UPR environment?
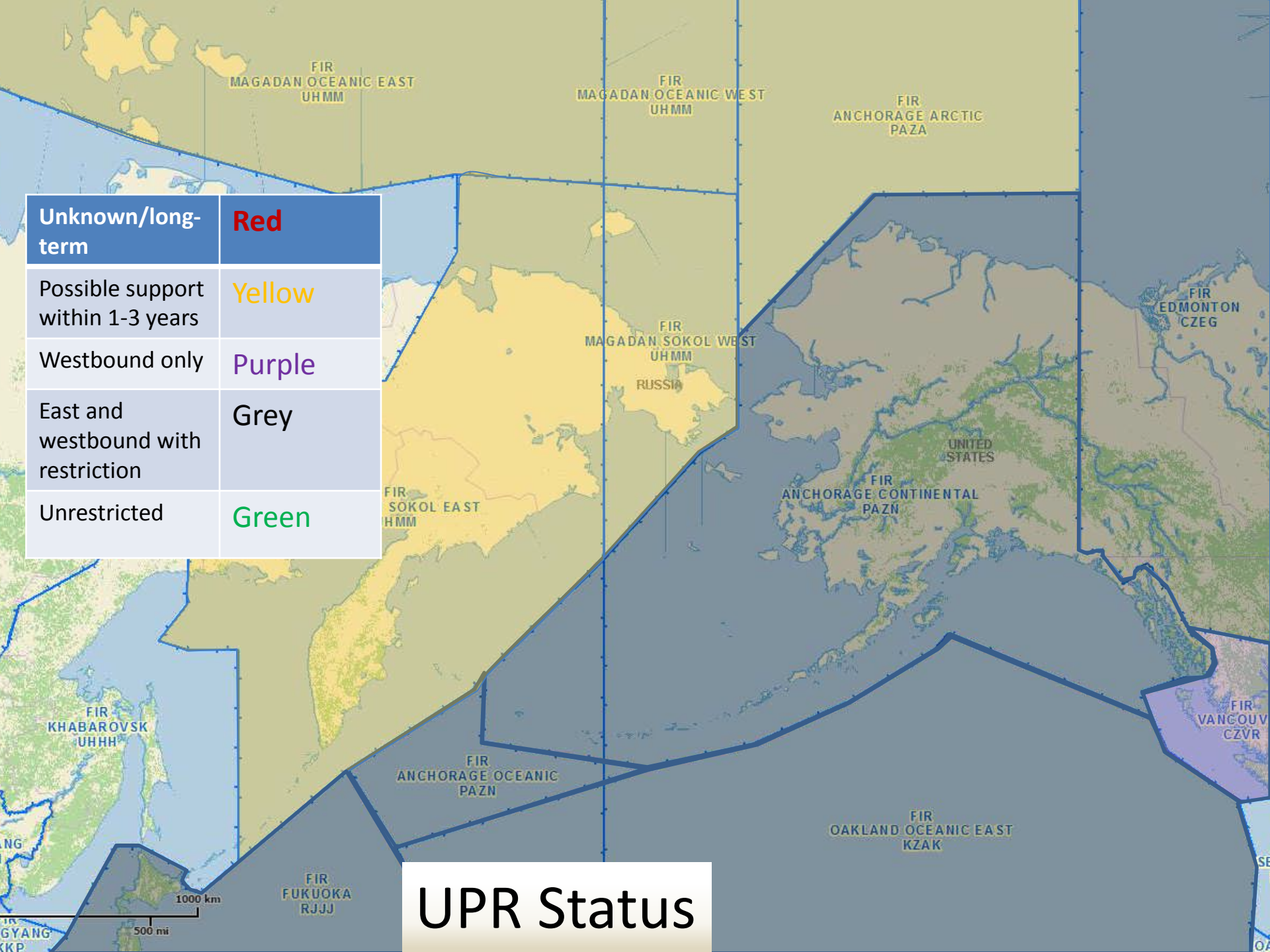
Unknown/long-term	**Red**
Possible support within 1-3 years	Yellow
Westbound only	Purple
East and westbound with restriction	Grey
Unrestricted	Green

UPR Status

Operator-Perceived Shortfalls or Lack of Efficiency

- **Based on current status of UPRs and consideration of what items are needed to support-**
  - What do operators see as priority areas?
  - Using seamless airspace chart and other considerations, what are short, mid, and long-term goals?
    - What are success criteria for each goal?
    - What is the desired end state?

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Questions?